Remarks

Upon entry of the foregoing amendment, claim 6 is pending in the application. Claims 1, 3, 4, 7, 10 and 11 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claim 6 is sought to be amended. Support for the amendment can be found, for example, from page 3, line 16 to page 4, line 5 of the specification.

These changes are believed to introduce no new matter, and their entry is respectfully requested. Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Statement of Substance of Examiner Interview

The Examiner contacted one of Applicants' representatives on January 15, 2008, after reviewing the case history and amendments, and informed him that claim 6 and its dependent claims would be allowed, if Applicants gave permission to the Examiner to cancel claims 1, 3, 4 and 7 by Examiner's amendment. Applicants provided the authorization on January 18, 2008 to cancel claims 1, 3, 4, and 7. The Examiner later contacted one of Applicants' representatives and informed him that the Primary Examiner and Supervisory Patent Examiner determined that claims 6, 10 and 11 were not allowable.

Rejections under 35 U.S.C. § 103(a)

The First 103 Rejection

The Examiner rejected claims 1, 3 and 7 under 35 U.S.C. § 103(a) as allegedly unpatentable over Mandecki *et al.* (U.S. Pat. No. 6,046,003) in view of Akram *et al.* (U.S. Pat. No. 6,250,192). Applicants respectfully traverse this rejection.

Solely to advance prosecution, and not in acquiescence to the Examiner's rejection, Applicants have cancelled claims 1, 3 and 7. Accordingly, this rejection is now moot.

The Second 103 Rejection

The Examiner rejected claim 4 under 35 U.S.C. § 103(a) as allegedly unpatentable over Mandecki *et al.* in view of Akram *et al.* and further in view of Stavrianopoulos *et al.* (U.S. Pat. No. 4,994,373). Applicants respectfully traverse this rejection.

Solely to advance prosecution, and not in acquiescence to the Examiner's rejection, Applicants have cancelled claim 4. Accordingly, this rejection is now moot.

The Third 103 Rejection

The Examiner rejected claims 6, 10 and 11 under 35 U.S.C. § 103(a) as allegedly unpatentable over Nova *et al.* (U.S. Pat. No. 5,741,462) in view of Akram *et al.*, Geng *et al.*, *J. of Chromatography B*, 752:293-306 (2001) and further in view of Hirabayashi *et al.*, *Proteomics* 1:295-303 (2001).

The Examiner alleges that Nova *et al.* teach a method for producing a labeled protein wherein the method comprises binding a protein that has a sugar chain (an antibody) to a large scale integrated circuit. The Examiner admits that Nova *et al.* do not teach a number of limitations of Applicants' claims. For example, the Examiner admits that Nova *et al.* do not teach 1) use of integrated circuits with 320 million bits of memory; 2) that the binding of the protein to the circuit is by the sugar chain; and 3) recording specific information characteristic of the sugar chain of the protein. See Office Action, p. 8.

The Examiner relies on the alleged teachings of Akram *et al.* and Geng *et al.* to cure the deficiencies of Nova *et al.* The Examiner contends that Akram *et al.* teach the use of RFID integrated circuits with a capacity of 64 megabytes and that Geng *et al.* teach that glycopeptides can be bound via a sugar chain to lectin, and recording specific information characteristic of the sugar chain of the protein. The Examiner further asserts that Geng *et al.* teach that a substrate, *e.g.*, silicon denatured polymer, mediates binding of the protein to LSI. The Examiner concludes that it would have been *prima facie* obvious to use the different lectins as taught by Geng *et al.* to bind the glycoproteins via the sugar chain to the integrated circuit as taught by Nova *et al.* The Examiner asserts that the motivation for the combination comes from Hirabayashi *et al.*, which allegedly teach that glycans are "bar codes" to identify various cell types and that "it is important to consider which lectin should be used for isolation of glycoproteins." The Examiner asserts that Nova *et al.* and Akram *et al.* provide the motivation to use larger integrated circuits since Nova *et al.* expressly states that "[g]reater memory capacity, where needed, and smaller chips, however, will be preferred" and that Akram *et al.* teach that it may be

desirable to design and fabricate a semiconductor wafer having integrated circuits of different sizes. The Examiner contends that in order to accommodate all of the possibilities, the ordinary practitioner would have been motivated to utilize the RFID device of Akram *et al.* in the method of Nova *et al.* when the glycans to be analyzed are so varied in order to permit analysis of all of the possibilities. Applicants respectfully traverse the rejection.

Solely to advance prosecution, Applicants have incorporated the limitations from claims 10 and 11 into claim 6. Specifically, claim 6 has been amended to specify that the binding of the protein via the sugar chain and the LSI is direct binding or indirect binding. If the binding is indirect, it is mediated by a substrate selected from the group consisting of cellulose vinyl acetate, α-cyanoacrylate, silicon denatured polymer, epoxy resin, and calcium sulfate. None of the art cited by the Examiner would prompt the skilled artisan to bind a protein via the sugar chain to an LSI, directly or indirectly via cellulose vinyl acetate, α-cyanoacrylate, silicon denatured polymer, epoxy resin or calcium sulfate, and record specific information characteristic of the sugar chain of the protein on the LSI according to the claimed invention. Therefore, whether a person of ordinary skill in the art would have been motivated to bind a protein to an LSI via a sugar chain indirectly via lectin is not relevant to the patentability of Applicants' claims.

Applicants note that the present invention accomplishes labeling of a protein having a sugar chain (hereinafter "glycoprotein") by (i) direct binding of glycoprotein onto an LSI via its sugar chain or (ii) indirect binding mediated by a substrate. The claimed method is distinguishable from the combined teachings of Nova *et al.*, Akram *et al.*, Geng *et al.*, and Hirabayashi *et al.*, in that it does not require lectin in the binding of

the glycoprotein to the LSI. By not using lectin, the claimed method offers an advantageous effect. For example, an analysis (by a blotting method or some other method) on a glycoprotein immobilized on an LSI without lectin can have a lower background as compared with an analysis on a glycoprotein immobilized *using* lectin. Thus, nonspecific reaction to lectin during the analysis can be avoided. Furthermore, compared with using lectin in the binding of glycoproteins onto an LSI, glycoproteins bound to the solid support via direct binding can be more easily detached. This also offers a practical advantage and the cited art would not have prompted the skilled artisan to attach a glycoprotein directly via the sugar chain to an LSI according to the claimed invention.

Moreover, the Examiner states that Geng *et al.* teach substrate mediated binding to the LSI using silicon denatured polymer. Applicants respectfully disagree with the Examiner. While Geng *et al.* utilize a lectin column containing silica, Geng *et al.* do not teach indirect binding of a glycoprotein to an LSI. In contrast, Geng *et al.* were interested in identifying glycoproteins in complex mixtures using biochemical and chromatographic techniques. Geng *et al.* digested proteins in a complex mixture with trypsin and isolated the glycoproteins by adding the digest to a column containing immobilizing lectin. The peptides were then further purified by reverse phase liquid chromatography and their identity was determined by mass spectrometry and a database search. In other words, Geng *et al.* bear no resemblance to the Applicants' claimed invention because Geng *et al.* do not teach binding of a protein to an LSI, and provides no reason to do so.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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